

vicinity of the catalyst for a longer period of time before exiting the device). A unit such as that shown in Figure 8 purifies air faster than a smaller unit. In all other respects, the embodiment shown in Figure 8 is similar to that shown in Figure 1.

It should be noted that the embodiments disclosed are for purposes of illustration of the principles of the invention. Many other embodiments and realizations may be made without deviating from the scope of the present invention. Many materials can be substituted for the ones named in the disclosed embodiments; any material with similar properties to the one disclosed is within the scope of the present invention.

I claim:

1. A device for purifying air comprising:

a reactor;

a photocatalyst located in said reactor;

an ultraviolet light source located in said reactor, said ultraviolet source illuminating said photocatalyst;

a heater located in said reactor, whereby air is drawn into

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Sub B1

SubB1  
said reactor by convection, said air rising past said photocatalyst before being expelled.

2. The device for purifying air of claim 1 further comprising: a pair of electrical prongs protruding from said device, whereby  
5 said device can be directly plugged into an electrical outlet.

3. The device for purifying air of claim 1 wherein said photocatalyst is primarily titanium dioxide.

4. The device for purifying air of claim 3 wherein said titanium dioxide is doped with a dopant.

5. The device for purifying air of claim 4 wherein said dopant is platinum.

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6. The device for purifying air of claim 1 further comprising a means for controlling humidity in said chimney.

7. The device for purifying air of claim 1 further comprising a  
15 fibrous mass located in said chimney, said fibrous mass holding said photocatalyst.

8. The device for purifying air of claim 7 wherein said fibrous mass is fiber glass.

9. The device for purifying air of claim 1 wherein said ultraviolet light source emits light of wavelength shorter than 387 nanometers.

5 10. A compact device with a base and a top for purifying air that is plugged directly into a wall power outlet comprising a set of power prongs protruding from the device for plugging into the wall outlet, a compartment containing a photocatalyst that is illuminated by an ultraviolet light source, an opening at the base of the device for air to enter, a heater in the device near this opening that heats air entering the device causing this air to rise past the illuminated photocatalyst, the air becoming purified, and an exit port at the top of the device for the purified air to exit.

15 11. The compact device of claim 10 where the photocatalyst is primarily titanium dioxide.

12. The compact device of claim 11 where the titanium dioxide is doped with platinum.

13. The compact device of claim 11 where the ultraviolet light source emits light of wavelength shorter than 400 nanometers.

20 14. The compact device of claim 13 where the ultraviolet light source emits light of wavelength longer than 350 nanometers, the

light source also producing visible light.

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15. The compact device of claim 14 further comprising an opening that allows the visible light to escape, whereby the device acts as a night light while purifying air.

5 16. A method of purifying air comprising:

allowing contaminated air to enter a reactor, this reactor containing a heater to heat said air;

allowing said heated air to rise naturally by convection past a photocatalyst, said photocatalyst being illuminated by an ultraviolet light source, said air being purified by said photocatalyst;

allowing said purified air to exit said reactor.

17. The method of claim 16 wherein said photocatalyst is primarily titanium dioxide.

15 18. The method of claim 17 wherein said photocatalyst is doped.

19. The method of claim 16 wherein said reactor is contained in a device with protruding electrical prongs so that said device can be directly plugged into an electrical outlet, said electrical

outlet supplying energy for said heater and said ultraviolet light source.

20. The method of claim 16 further comprising using an ultraviolet light source which also produces visible light and allowing  
5 said visible light to escape.

21. A device for purifying air comprising:

a chimney with a base and top;

a photocatalyst located in said chimney;

an ultraviolet light source located in said chimney, said  
10 ultraviolet source illuminating said photocatalyst with  
ultraviolet light of wavelength shorter than 387 nanometers,  
said ultraviolet light source also producing visible light;

a heater located at the base of said chimney, whereby air is  
drawn into said chimney by convection, said air rising past  
15 said photocatalyst being expelled from the top of said chimney;  
ney;

a means for allowing said visible light to escape from said  
chimney, said device also becoming a night light.